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An easy method of modifying solutions for the motion of an undamped system to account for damping. JANUARY 1960 PAGE 36
DAMPING FACTORS
Dangers in single source "special" components. JUNE 1958 PAGE 26
DASHPOT, AIR-DAMPED
Light, small, low-cost dashpot provides adjustable damping for solving stability problems. JUNE 1962 PAGE 24
DATA STORAGE
Access to 600 million bits in 167 milliseconds. APRIL 1961 PAGE 28
DELAY LINES, ULTRASONIC
Multicomponent glass materials reduce temperature dependence. MARCH 1960 PAGE 14
DETECTION, INFRARED AND PHOTO
Physical principles, generation, transmission, collection, detection, measuring illumination, semiconductor detectors, application techniques. JULY 1961 PAGE 41
DEVICES, ELECTROMECHANICAL — RATING OF INTERMITTENT-DUTY
Selection of a rating system adapted to the applications and based on controlled experiments provides valuable data to the user. APRIL 1962 PAGE 24
DIELECTRIC, FILM FORMING
Two to six times greater capacitance per unit volume. SEPTEMBER 1960 PAGE 50
DIFFERENTIAL ANALYZER, ANALOG-DIGITAL
Digital registers combined with analog elements provide greater precision than conventional analog computers. NOVEMBER 1960 PAGE 45
DIGITAL ANALOG, HYBRID SHAFT-ANGLE INDICATOR WITH FRICTION-LESS "OPTICAL GEARING"
An invention using novel optical techniques converts shaft motion into triangular waveforms. MAY 1958 PAGE 12

DIGITAL CLOCK
Rotary solenoids and printed circuit commutators produce time patterns for many applications. MARCH 1958 PAGE 8

DIODE TESTER
Portable unit checks polarity in specified circuit positions.
FEBRUARY 1961 PAGE 37

DIODE TESTING
Magnetic four point clip eliminates errors.
SEPTEMBER 1961 PAGE 24

DIODES, SILICON, MINIATURE, DISSIPATE 10-WATT OVERLOAD WITHOUT FAILURE
Bonding the diffused silicon wafer directly between terminal pins and fusing a hardglass sleeve to all exposed silicon surfaces and the terminal pins permanently stabilizes electrical characteristics.
SEPTEMBER 1961 PAGE 8

DIODES AND TRANSISTORS, HERMETICALLY SEALED SILICON CHIP
Micro-thin glass film seals reliability into hundreds of devices in one operation.
DECEMBER 1961 PAGE 20

DRIVE, AC ADJUSTABLE SPEED
AC and dc motors on single shaft. Shunt field of dc motor, excited by semi-conductor-rectified ac line voltage, is controlled by rheostat to adjust speed. Rectified slip power of ac motor converted to output power in dc motor.
JUNE 1958 PAGE 24

DRIVE, 600°F CONSTANT SPEED
Mechanical traction, variable ratio transmission drive with mechanical speed, control trimmed against an electronic frequency standard powers and controls aircraft alterations in 600°F ambients.
OCTOBER 1959 PAGE 30

DRIVE, HARMONIC
A new kind of mechanical transmission.
NOV. - DEC. 1957 PAGE 28

DRIVE, MACHINE TOOL
Auto-transformers and silicon rectifiers form variable speed drive.
JULY 1959 PAGE 20

DRIVE, PACKAGED
Static devices and dc adjustable drives for machine tool systems.
JUNE 1959 PAGE 40

DRIVE, PRECISION DC VARIABLE SPEED
Careful brush and commutator design minimizes brush drop of feedback tachometer. FEBRUARY 1959 PAGE 24

DRIVE, VARIABLE SPEED
Armature control of dc motor using silicon controlled rectifiers.
SEPTEMBER 1960 PAGE 14

DRIVE, VARIABLE SPEED
Overload clutch, speed variator or torque multiplier for servo applications.
MAY 1961 PAGE 14

DRIVE, VARIABLE SPEED
Teflon-coated shafts considered major industry break-through.
JULY 1962 PAGE 32

DRY CIRCUIT TESTING
Use of a unique pulsing and gating technique avoids contact transfer and bounce errors and results in a testing system that is approximately 10 times more sensitive than most dry circuit test requirements. AUGUST 1962 PAGE 18

ELAPSED TIME COMPUTATION
An inexpensive technique for performing arithmetical operations.
JANUARY 1960 PAGE 28

ELAPSED TIME INDICATOR
Novel design approach in miniaturization.
SEPT. - OCT. 1957 PAGE 18

ELAPSED TIME PROGRAMMER
Three design approaches for controlling the closing of contacts by the joint position of timing drums.
SEPTEMBER 1960 PAGE 25

ELECTROFORMING
New latitudes in design.
SEPT. - OCT. 1958 PAGE 84

ELECTRON SOURCE, NEW
Electronic tubes may some day be transistorized. SEPTEMBER 1959 PAGE 40

ELECTROSURGERY
Improved design for electronic scalpel.
JAN. - FEB. 1958 PAGE 36

ENCODER, DIGITAL, MAGNETIC SHAFT-POSITIONING
New pick-off design removes limitation on resolution of magnetic units.
SEPTEMBER 1959 PAGE 4

ENCODERS, MAGNETIC
Altering the magnetic state of ferrite readout cores generates a fast, reliable shaft angle-to-digital conversion.
MAY 1960 PAGE 16

ENCODER, SHAFT ANGLE, DIGITAL
Alignment cell built into this optical angle-to-digital converter makes possible angle indication accurate to better than 2.5 minutes of arc in a production model.
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ENCODER, SHAFT ANGLE, SYSTEM APPLICATIONS OF
V-scan logic design.
OCTOBER 1960 PAGE 44

ENCODER, TESTER
One million logic operations in less than 3 minutes. OCTOBER 1961 PAGE 47

ENCODER, WITH MAGNETIC READOUT, DIGITAL
Barium ferrite disc, radially spot magnetized, eliminates contacts.
JANUARY 1959 PAGE 10

ENERGY CONVERSION, HEAT-ELECTRICAL
Practical, commercially available thermionic converters. Thermoelectric devices for high efficiency heating or cooling. New thermoelectric alloy.
OCTOBER 1960 PAGE 34

EPOXY RESIN
Epoxies demonstrate superior strength and stability at high temperatures.
MARCH 1960 PAGE 42

EPOXY RESIN
Coating intricate shapes for insulating and moisture proofing.
JULY 1960 PAGE 34

ERROR ANALYSIS, A RAPID METHOD OF
Equations for determining the effect of any guidance component error on target accuracy. NOVEMBER 1962 PAGE 44

FAILURE LOCATION, AUTOMATIC
A building block approach to reliable system maintenance.
AUGUST 1960 PAGE 28

FANS AND BLOWERS
Steps in design, air flow circuit fundamentals, matching the blower and air current, arrangement of the air flow current, variable altitude operation, effect of air density changes, designing for advanced applications, summary of performance characteristics of commercially available fans and blowers.
JANUARY 1961 PAGE 57

FASTENERS, VIBRATION-RESISTANT
Locking insert helps reduce aircraft costs by 30%. JULY 1960 PAGE 30

FASTENERS AND CONNECTORS
Part I: Military Connectors-multiple contact, design and selection factors, specifications, environmental factors, buyer's guide for connectors, quick operating fasteners, selection factors, standards, buyer's guide for fasteners.
MAY 1959 PAGE 6
Part II: RF connectors; Printed circuit connectors; Umbilical connectors.
JULY 1959 PAGE 33

FASTENING DESIGNS
Part I: Over 100 fastening methods for speed, inserts, safety, simplicity, appearance, adjustment and sealing.
MAY 1960 PAGE 46
Part II: Platings, finishes, head terminology and point terminology associated with the selection and application of fasteners. AUGUST 1960 PAGE 56

FERRITE MATERIAL AND COMPONENTS
Magnetic-gyro characteristics of free electrons in ferrites provide unique properties. MAY 1961 PAGE 52

FERRITES FOR ELECTROMECHANICAL APPLICATIONS
Performance characteristics of ferromagnetic materials developed for gyros, microwave devices and transducers.
NOVEMBER 1959 PAGE 22

FIBER FINENESS INDICATOR, ELECTRONIC
New solution for an old problem in the textile industry.
SEPT. - OCT. 1957 PAGE 45

FILM, MOLLY BONDED
Lubrication for components exposed to high temperatures, corrosion, and extreme loading.
APRIL 1960 PAGE 50

FILM PROCESSOR, RAPID
From test to film in twenty minutes.
JAN. - FEB. 1958 PAGE 46

FILTER, CRYSTAL, HIGH FREQUENCY
New solutions for design problems in communication, navigation and other commercial and military systems.
SEPT.-OCT. 1957 PAGE 12

FILTER, MECHANICAL, SIZE 8
Proper application of a new integrated package in servo systems results in a velocity error approaching zero.
AUGUST 1962 PAGE 28

FILTER FOR SERVO MODULATORS AND DEMODULATORS
Notch filters reject unwanted frequencies without influencing servo information.
MAY 1961 PAGE 14

FINNED DESIGN, STRESS ANALYSIS IN
APRIL 1958 PAGE 56

FLOW GRAPHS, AN INTRODUCTION TO
Essential characteristics and applications in simplest possible terms, of a technique for evaluating a system or device almost by inspection. JULY 1962 PAGE 34

FLOWMETER
New technique combines generation of the square root with the summing action of an all mechanical integrator to provide direct readings of total flow.
JANUARY 1959 PAGE 4

FLOWMETER, DIRECT READING
Heated thermopile element in a flow tube provides direct reading of total mass flow of air or other gases independent of temperature and pressure variations.
JULY 1958 PAGE 10

FLOWMETER, "TRUE MASS"
Novel technique uses small gyro to totalize flow. JULY 1959 PAGE 18

FLOWMETER, TURBINE, PICKOFF
AC carrier transducer with high frequency signal output.
FEBRUARY 1959 PAGE 14

FORCE AMPLIFIER
Mechanical unit eliminates need for electronic components in indication of process variables. SEPTEMBER 1959 PAGE 7

FREQUENCY — PREDICTING RESPONSE TO MODULATED INPUTS FROM RESPONSE TO SINE WAVE INPUTS
A simple method of determining a component's frequency response.
OCTOBER 1959 PAGE 48

FUEL CELL
Smog-free power for cars.
AUGUST 1960 PAGE 37

FUEL CELL, ION-MEMBRANE
Solid electrolyte makes direct chemical-to-electrical energy conversion a practical power source. JUNE 1960 PAGE 24

FURNACES, ARC IMAGING
Contamination of specimen eliminated in new design. MAY 1961 PAGE 42

FURNACES, "THREE-SECOND SUN"
Precise measurement of high temperature properties of materials with new heating element.
APRIL 1962 PAGE 40

FURNACES FOR SEMICONDUCTORS
The secret of furnace design for a rapidly changing product.
SEPT.-OCT. 1957 PAGE 50

GAUGE, MISCUT
Photocells measure length of steel sheets moving at 50,000 ft/sec on a conveyor belt and trigger mechanism to reject those over or under length.
NOVEMBER 1958 PAGE 37

GEAR CHECKER, AUTOMATIC
Automatic inspection for concentricity.
NOV.-DEC. 1958 PAGE 74

GEAR PUMP
Cartridge construction with hydraulically and thermally controlled positive clearance frees pump from mechanical drag, permitting operation at high speed.
NOVEMBER 1958 PAGE 14

GEAR REDUCER, ADJUSTABLE, FOR CONTROL SYSTEMS
Gear reducer design permits speed ratios to be changed under full load.
APRIL 1958 PAGE 4

GEAR TRAIN, STRAIGHTENING, SYSTEM
Fast, flexible, economical way to build a gear train. NOVEMBER 1961 PAGE 32

GEAR TRAIN ANALYZER
Constant torque actuator measures lost motion. MARCH 1958 PAGE 36

GEARS, LOCKED TRAIN, TO REDUCE BACKLASH
A sometimes overlooked method for reducing backlash in instrument gear trains.
NOVEMBER 1962 PAGE 82

GENERATOR, ACYCLIC
Liquid-metal current collector system solves key problem in the commercial use of acyclic machines.
MARCH 1962 PAGE 36

GENERATOR, DIGITAL PATTERN
Inserting magnetic plugs in pegboards speeds digital programming.
MARCH 1962 PAGE 56

GENERATOR, ELECTROSTATIC
Using compressed gas as the dielectric, French engineers greatly multiplied the power of electrostatic generators making them practical for industrial applications of medium high voltages.
NOVEMBER 1958 PAGE 24

GENERATOR, HALL EFFECT
Solid state resolvers promise functional accuracy of 0.005% at both 60 and 400 cps. JANUARY 1961 PAGE 14

GENERATOR, LOW-FREQUENCY, MECHANICAL
Versatile cam design generates many arbitrary waveforms.
DECEMBER 1960 PAGE 16

GENERATOR, MAGNETO-THERMIONIC
External magnetic field permits greater design flexibility for high power generation. NOVEMBER 1960 PAGE 42

GENERATOR, MILLIMICROSECOND PULSE
4 amp jitter-free pulses for high speed magnetic studies. MAY 1960 PAGE 17

GENERATOR, PHASE, ELECTROMECHANICAL
Phase shifting without tubes or transistors.
SEPT.-OCT. 1957 PAGE 20

GENERATOR, PULSE SEQUENCE
Simply spacing magnets at intervals along delay line generates timed pulses for logic, control, and testing.
DECEMBER 1961 PAGE 33

GENERATOR, THERMOELECTRIC
Isothermal Hot Rod, Key to Optimum Performance. AUGUST 1961 PAGE 14

GENEVA-DRIVE ACTUATORS
Electrically powered, mechanically positioned actuators require no moving clutches, brakes or limit switch adjustments. NOVEMBER 1958 PAGE 4

GROUND SUPPORT EQUIPMENT
Count-down monitoring of multiple power supplies. JULY 1959 PAGE 16

GUIDANCE, A RAPID METHOD OF ERROR ANALYSIS
Equations for determining the effect of any guidance component error on target accuracy. NOVEMBER 1962 PAGE 44

GUIDANCE, INERTIAL
Drift sensitivity of miniature gyro less than 0.005°/hr.
SEPTEMBER 1961 PAGE 12

GUIDANCE, INERTIAL, WITHOUT GIMBALS
Minimizing errors produced from mounting inertial components on an unstabilized base. NOVEMBER 1959 PAGE 18

GYRO, CERAMIC
Sub-Hydrodynamic suspension of a gyro in a miniature long-life bearing element accomplished. JULY 1960 PAGE 18

GYRO, INERTIAL, FLUID SPHERE
Elimination of spinning wheel reduces drift and cost.
NOVEMBER 1961 PAGE 30

GYRO, INERTIAL, TEST
Versatile torque-feedback system measures drift rate components without the use of rate tables.
NOVEMBER 1960 PAGE 18

GYRO, MINIATURE RATE
Inside-out differential transform pickoff.
FEBRUARY 1959 PAGE 8

GYRO, RATE
Dashpot damper design minimizes temperature dependence.
JAN.-FEB. 1958 PAGE 14

GYRO, SPRING DRIVEN
Missile roll reference for $150.
OCTOBER 1959 PAGE 14

GYRO PACKAGE SHAKEDOWN
System and procedure for vibration testing of turn-rate transmitter under operating conditions. JUNE 1958 PAGE 20

GYRO-ACCELEROMETER PACKAGE
Self-testing capabilities designed into equipment increase reliability.
JUNE 1960 PAGE 58

HALL EFFECT, APPLICATIONS OF THE
Hall multiplier serves as a wattmeter.
JANUARY 1960 PAGE 14

HALL EFFECT GENERATOR
Solid state resolvers promise functional accuracy of 0.005% at both 60 and 400 cps. JANUARY 1961 PAGE 14

HARDWARE, INSTALLATION
Multi-function chassis latches simplify computer design. MAY 1958 PAGE 36

HIGH TEMPERATURE SOURCE
Small plasma generator produces 2500 to 12,000°F inexpensively.
SEPTEMBER 1959 PAGE 37

HONEYCOMB SANDWICHES
New adhesive film makes strong panels.
JAN.-FEB. 1958 PAGE 52

HYDRAULIC PRESSURE CONTROL
Motorized actuator replaces manual adjustment of valves.
APRIL 1960 PAGE 28

HYDRAULIC ROTARY ACTUATOR, MINIATURE
Two four-ounce dual-valve actuators drive airborne radar antenna.
JUNE 1960 PAGE 10

HYSTERESISCOPE, THE
Inexperienced personnel can quickly test magnetic materials with new tool.
MARCH 1962 PAGE 52

IMPEDANCE TESTING, MECHANICAL
Impedance head measures forces and accelerations at the same point.
MAY 1961 PAGE 44

INDICATOR, DIGITAL, ANALOG, HYBIRD SHAFT-ANGLE, WITH FRICTIONLESS "OPTICAL GEARING."
An invention using novel optical techniques converts shaft motion into triangular waveforms.
MAY 1958 PAGE 12

INDICATOR, ELAPSED TIME
Novel design approach in miniaturization.
SEPT.-OCT. 1957 PAGE 18

INDICATOR, FIBRE FINENESS, ELECTRONIC

INDICATOR, TWO-INCH ATTITUDE
Standby indicating system virtually equals primary system.
JANUARY 1960 PAGE 26

INDUCTORS, CONTROLLABLE
Switching ideas and techniques for radio frequency circuits.
SEPT.-OCT. 1957 PAGE 28

INDUCTORS, CONTROLLABLE CHARACTERISTICS
Ranges of performance attainable and some effective applications.
MARCH 1959 PAGE 10

INDUCTORS, MINIATURE STABLE
New circuit and construction techniques result in 10 times more inductance in same space — with 1% stability.
FEBRUARY 1962 PAGE 18

INERTIAL GUIDANCE
Drift sensitivity of miniature gyro less than 0.005°/hr.
SEPTEMBER 1961 PAGE 12

INERTIAL GUIDANCE WITHOUT GIMBALS
Minimizing errors produced from mounting inertial components on an unstabilized base. NOVEMBER 1959 PAGE 18

INFRARED AND PHOTO DETECTION
Physical principles, generation, transmission collection, detection, measuring illumination, semiconductor detectors, application techniques. JULY 1961 PAGE 41

INFRARED INSTRUMENTATION
New detector gives fast response to cool body radiation. New refrigeration technique increases infrared sensitivity. Infrared radiation varies electrical conductivity of gold-germanium.
JUNE 1959 PAGE 44

INSPECTION, PRECISION
40-70 percent time reduction with closed circuit TV system.
APRIL 1961 PAGE 34

INSTRUMENT, AIRCRAFT
Two-gyro master reference.
MARCH 1958 PAGE 35

INSTRUMENTATION
Clamp-type AC microammeter, transistorized. MARCH 1958 PAGE 30

INSTRUMENTATION, INFRARED
New detector gives fast response to cool body radiation. New refrigeration technique increases infrared sensitivity. Infrared radiation varies electrical conductivity of gold germanium.
JUNE 1959 PAGE 44

INSULATION, ELECTRICAL
Part I: The insulation design problem, insulation characteristics, hi-pot testing, selection of specific insulations, conference papers on applications, new insulations for electromechanical designs, new insulation literature.
Part II: Types of chemical bonds, failure and breakdown values, solid insulation dielectric breakdown theories, air breakdown voltage endurance, spacing and creepage, moisture effects, Class F insulations, magnet wire insulations, evaluation techniques, varnish evaluation, silicon rubber tapes, pressure sensitive tapes, high temperature components.
FEBRUARY 1961 PAGE 45

INSULATION, MOTOR, SURVEY OF
Standardization on higher temperature levels envisioned.
OCTOBER 1961 PAGE 36

INSULATION, WIRE
Flexible, fluoride film coatings provide exceptionally high insulation value at high temperature. JUNE 1959 PAGE 46

INSULATION MATERIAL
Ceramoplastics, a precision moldable insulation material that withstands up to 1200F. APRIL 1961 PAGE 40

INTEGRATOR, ANALOG R-C, WITH DIGITAL OUTPUT
"Resetting" an analog integrator when its output exceeds a preset level results in 0.01% accuracy.
MARCH 1961 PAGE 14

INTEGRATOR, ELECTROMECHANICAL
For interplanetary or marine navigation where the primary requirement is high accuracy over long periods rather than extreme speed of response.
SEPTEMBER 1962 PAGE 58

INTEGRATORS
Time-based integrators, shaft-speed, pulse width, pulse rate, current integrators, computing applications.
OCTOBER 1961 PAGE 57

INVERTER, THREE-PHASE STATIC
Output voltage reaches full value in 100 microseconds. MAY 1958 PAGE 20

IONIZATION, THE ALPHAS AND BETAS OF
JUNE 1958 PAGE 48

ISOLATION TABLE, VIBRATION
Ball bearing supports isolate sensitive equipment from horizontal vibration and motion. JUNE 1961 PAGE 28

ISOLATOR, SHOCK AND VIBRATION, BASED ON SEISMIC MOTION
Pre-stressed, twisted cable strands between steel retainers provide 3-axis protection.
NOVEMBER 1961 PAGE 33

KLYSTRONS, COUPLED CAVITY STABILIZATION OF
Recent improvements in techniques for stable oscillators.
NOV.-DEC. 1957 PAGE 22

LIGHT, PILOT, SELECTION BY LAMP TYPE
DECEMBER 1960 PAGE 38

LIGHTNING ARRESTER DESIGN
Slotted laminate guides and insulates expanding spring connector designed to fasten lightning arrester to probe-type aircraft antenna.
NOVEMBER 1958 PAGE 34

LOAD CHARACTERISTICS, GENERALIZED DYNAMIC
Curves show, directly, available power from a motor and the optimum gear ratio for any load acceleration to velocity ratio. SEPTEMBER 1959 PAGE 44

LUMISTORS
Electrolumistors combined with photoconductors amplify electric signals.
JANUARY 1959 PAGE 14

MACHINE CONTROL, TRANSISTORIZED
Design problems in the development of a static control modular system that combines simplicity of design with high performance at a lower cost.
OCTOBER 1961 PAGE 30

MACHINE SPEED CONTROL
New means with pneumatics.
JAN.-FEB. 1958 PAGE 20

MACHINE TOOL COMPONENTS
Machine tool designers and users look critically at control components available to their industry. JUNE 1959 PAGE 4

MACHINE TOOL CONTROL
Numerical positioning system with floating zero includes work table in a servo loop. MARCH 1962 PAGE 44

MACHINE TOOL DRIVE
Auto-transformers and silicon rectifiers form variable speed drive.
JULY 1959 PAGE 20

MACHINE TOOL POSITION CONTROL
Positioning machine tools with digital data. NOV.-DEC. 1957 PAGE 42

MACHINE TOOL SPEED CONTROL
Faster response, easier control and higher efficiency with electronic speed drive.
NOV.-DEC. 1957 PAGE 65

MACHINE TOOL SYSTEM
Punched tape and transistorized computer convert blueprints into machined parts.
APRIL 1958 PAGE 46

MACHINING AND WELDING, Electron Beam
Precision process packs energy density of 600 million watts per square inch.
MARCH 1960

MAGNETIC ANALOG STORAGE
Economical digital-to-voltage conversion system. JANUARY 1960 PAGE 22

MAGNETIC ENCODERS
Altering the magnetic state of ferrite readout cores generates a fast, reliable shaft angle-to-digital conversion.
MAY 1960 PAGE 16

MAGNETOMETER, RUBIDIUM
A new method of indicating the strength of magnetic fields based on light absorption by rubidium vapor.
JULY 1958 PAGE 22

MAGNETRON, VOLTAGE TUNABLE
New smaller VTM packages are ½ order of magnitude improvement in power output and efficiency. JUNE 1959 PAGE 16

MAGNETS, CRYOGENIC
Niobium-tin solenoid superconductive in field of 88,000 gauss.
MARCH 1961 PAGE 48

MAGNISTOR, INTEGRATED
New circuit technique combines the transient magnistor (high speed saturable reactor) with the permanent magnistor (saturable reactor with memory) permitting them to share a common signal element between the two control elements.
DECEMBER 1958 PAGE 4

MASER, GASEOUS OPTICAL
Continuously operating maser emits highly directional, narrow coherent beam.
APRIL 1961 PAGE 50

MASER, OPTICAL
Coherent light source extends radio frequency band into optical range.
SEPTEMBER 1960 PAGE 52

MASER AMPLIFIER
New techniques reduce noise temperature to less than 10°K.
MARCH 1960 PAGE 16

MASER OSCILLATOR, AMMONIA-TYPE
Better than one part in one billion stability. APRIL 1958 PAGE 35

MATERIALS
Germanium Dendrites, a "molecular electronics" material.
SEPTEMBER 1959 PAGE 41

MATERIALS — SO WHAT ELSE IS NEW?
Chemist report new materials for the electromechanical engineer. David Bandel, Staff Columnist.
JANUARY 1960 PAGE 32

MATERIALS
Ceramic fibers-to-metal bond withstands very high temperatures.
SEPTEMBER 1960 PAGE 53

MATERIALS, ELECTRONIC
Research and development of advanced materials. FEBRUARY 1961 PAGE 33

MATERIALS, INSULATION
Ceramoplastics, a precision moldable insulation material that withstands up to 1200F. APRIL 1961 PAGE 40

MATERIALS, MISSILES, MICE AND MEN
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MATERIALS ANALYSIS
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MATERIALS AND COMPONENTS, FERRITE
Magnetic-gyro characteristics of free electrons in ferrites provide unique properties. MAY 1961 PAGE 52

MATERIALS AND RADIATION
Part I: Applications of interaction between radiation and matter. David Bandel, Staff Columnist.
JANUARY 1959 PAGE 32
Part II: Effects of high-level radiation on mechanical and electrical properties of materials. David Bandel, Staff Columnist. APRIL 1959 PAGE 36

MATERIALS AND TECHNIQUES FOR HIGH TEMPERATURE COMPONENTS
Part I: Evaluating and selecting insulations & insulating materials; conductors; soldered connections; ball bearings for high temperatures; lubrication application factors; high speed bearings; fits & tolerances; needle bearings; materials for rings, balls, retainers, shields & seals. DECEMBER 1959 PAGE 55
Part II: Magnetic materials.
JANUARY 1960 PAGE 48

MATERIALS HANDLING SYSTEM, ROLLED
Electromechanical equipment simplifies handling, loading, unwinding and winding of all sizes of paper, textiles, sheet metal and other rolled materials.
JULY 1958 PAGE 18

MATERIALS PROGRESS REPORT
Research results ready for application in nuclear materials, polymers, resins, lithium compounds.
NOV.-DEC. 1958 PAGE 68

MATERIALS TESTING SYSTEM, AUTOMATIC
Fast and accurate stress and strain analysis. JUNE 1960 PAGE 44

MEASUREMENTS, DENSITY
Unaffected by flow or disturbances.
FEBRUARY 1962 PAGE 16

MEASUREMENTS AND CONTROL, NEW IDEAS IN
Flow measurement for computer control; New voltage-to-digital conversion technique; A torque gauge without sliprings; New thermo-drive actuator.
NOVEMBER 1959 PAGE 4

MEASUREMENT TECHNIQUE
Gyromagnetic ratio of Proton improves accuracy by factor of four.
JANUARY 1959 PAGE 24

MECHANISMS, IN-LINE
New approach to design of sub-system modules. MAY 1958 PAGE 32

MEDICAL ENGINEERING
Color TV in the bio lab.
NOV.-DEC. 1957 PAGE 48

MEDICAL ENGINEERING
New kind of "Iron Lung" responds to automatic demand. MAY 1958 PAGE 38

MEMORY, BERNOULLI-DISK MAGNETIC
Fluid motion principles control separation between disk and heads to obtain greater density of data storage.
FEBRUARY 1960 PAGE 14

MEMORY, COMPUTER
How to store more bits on a drum.
NOV.-DEC. 1957 PAGE 50

MEMORY, COMPUTER
Air cushion separates disk from recording head. MAY 1958 PAGE 28

MEMORY, PERMANENT MAGNET
Data stored by photoetched array of bar magnets on plastic cards.
MARCH 1960 PAGE 28

MEMORY ARRAY, PLUG-IN
Current-steering diode circuitry and memory combined in single temperature controlled assembly.
FEBRUARY 1962 PAGE 32

MEMORY DEVICES
Six multi-element electromechanical and electrohydraulic memory devices that may solve some of your design problems.
JULY 1958 PAGE 20

MEMORY DEVICES, CRYOGENIC
Special automatic process accurately duplicates superconducting planes.
FEBRUARY 1961 PAGE 42

MEMORY DRUM, DIGITAL MAGNETIC
True-flux-responsive readout is independent of drum speed.
OCTOBER 1960 PAGE 26

MEMORY DRUM, MINIATURE
Long life and capacity extends the use of space computers.
APRIL 1961 PAGE 18

MEMORY SYSTEM, RANDOM ACCESS
Standard aperture ferrite memory plate is used as the storage medium in a

random access memory system.
DECEMBER 1958 PAGE 22

METALS, DETERMINING THE THERMOPLASTIC PROPERTIES OF
Two simple dynamic tests are an aid in designing springs for high-temperature applications. MARCH 1960 PAGE 38

METER, DIFFERENTIAL
Gyro design techniques develop precision instrument for monitoring or controlling current, voltage or power.
APRIL 1958 PAGE 18

METER, ELECTRICAL, COMPACT
Simplified magnetic circuit with parallel pole pieces and a single air gap achieves a uniform magnetic field, meter linearity and calibration accuracy.
SEPTEMBER 1962 PAGE 52

METER, FLOW
New technique combines generation of the square root with the summing action of an all-mechanical integrator to provide direct readings of total flow.
JANUARY 1959 PAGE 4

METER, MINIATURE, CONTROL
No contacts at set point allows full scale indication and eliminates contact resistance, arcing and corrosion.
APRIL 1959 PAGE 4

METER, PRECISION
Self-compensating dc amplifier is independent from load fluctuations.
MARCH 1962 PAGE 57

METER, VARIABLE VENTURI
Toric valve principle applied to a differential pressure flow meter provides accurate flow indication directly in terms of valve actuator position.
OCTOBER 1961 PAGE 20

METER, WATT-HOUR
Magnetic thrust bearing, key to friction-free design. AUGUST 1960 PAGE 25

METER RELAY
A simple and inexpensive method for controlling rate and magnitude of a change in any variable that can be measured electrically.
APRIL 1958 PAGE 10

METER RELAY, CONTINUOUS READING
Pointer trips v-shaped toggle switch.
SEPTEMBER 1959 PAGE 24

MICROELECTRONICS
Forming silicon semiconductor devices directly from a vapor is one of a series of new advances. JULY 1962 PAGE 42

MICRON, WHAT'S IN A CUBIC?
Just ask the electron probe microbeam analyzer. David Bandel. Staff Columnist.
SEPTEMBER 1959 PAGE 42

MICROPHOTOGRAPHY
Stopping fast transient events with a magneto-optic lens.
APRIL 1958 PAGE 42

MICROWAVE AMPLIFIERS, VARIABLE REACTANCE
Semiconductor diodes whose capacitance varies with voltage applied from high pump signal provide time varying capacitance and supply energy from amplification with reduced noise.
JULY 1958 PAGE 6

MICROWAVE "MISER"
Returning portion of spent beam to cathode increases tube efficiency.
JANUARY 1962 PAGE 32

MICROWAVE RADIO ENERGY
Eyetron, a new system that converts microwave radio energy into visible light.
APRIL 1958 PAGE 30

MILLIVOLTMETER, ANALOG TO DIGITAL
Unique servo driver tape-slidewire provides accurate digital readout.
FEBRUARY 1959 PAGE 22

MINIATURIZATION, DESIGNING FOR
Technique integrates mechanical, electrical and packaging design skills necessary for cramming the most performance into least space. AUGUST 1960 PAGE 44

MISSILE TRACKING
Film transport and shutter phasing designs take the bounce out of the camera.
SEPT.-OCT. 1957 PAGE 60

MODULAR PACKAGING
Universal incremental modules combine high structural strength with good economic maintainability.
MAY 1961 PAGE 36

MODULES, FAILURE-INDICATED
New waveform sampling device converts complex oututs of various modules to a simple dc voltage for functional analysis.
DECEMBER 1959 PAGE 18

MODULES, THERMOELECTRIC
Cooling below ambient temperatures significantly reduces component failure.
APRIL 1960 PAGE 24

MOISTURE MONITOR
Cell electrolyzes moisture present in stripping gas. SEPTEMBER 1959 PAGE 38

MOMENTS OF INERTIA OF A PARABOLOIDAL SHELL
Solution of the chief problem in the analysis of a radar antenna drive for a parabolic reflector.
NOVEMBER 1959 PAGE 45

MOTION COMPENSATORS — PRECISION ANGULAR
Miniature adjustable cam mechanisms correct angular position errors, design parameter non-linearities and potentiometer loading errors in servomechanisms.
JUNE 1962 PAGE 32

MOTOR AND POTENTIOMETER INTEGRATED ON COMMON SHAFT IN SPACE PROBE UNIT
OCTOBER 1962 PAGE 38

MOTOR BRUSH HOLDERS
Constant-force brush springs minimize brush wear. SEPTEMBER 1959 PAGE 10

MOTOR, CONTROL, DC TRACTION
Pulse width modulation regulates current in proportion to speed and load.
OCTOBER 1962 PAGE 52

MOTOR INSULATION, SURVEY OF
Standardization on higher temperature levels envisioned.
OCTOBER 1961 PAGE 36

MOTORS, AC SERVO — How to Get the Most Out of Your
Characteristics of a-c servo motors often overlooked by the systems designer.
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MOTORS, DC TORQUE, DIRECT DRIVE
Elimination of commutator results in no slot-lock and infinite resolution.
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MOTORS, DIRECT DRIVE TORQUE
DC servomotors provide efficient power and allow high loop gain in stabilization and tracking systems where size, weight, power requirements and response time must be minimized and high resolution is desirable. OCTOBER 1958 PAGE 6

MOTORS, ELECTRIC, DYNAMIC LOAD CHARACTERISTIC OF
A new way of selecting motors.
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MOTORS, ENCAPSULATED
Low-cost pre-formed molds virtually indestructible. SEPTEMBER 1961 PAGE 10

MOTORS, FRACTIONAL HORSEPOWER
Improvements reduce assembly and maintenance costs.
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MOTORS, FRACTIONAL HORSEPOWER
Induction motor characteristics, power supply requirements, principles of induction motors, characteristics determined from equivalent circuit, measuring the equivalent circuit, single phase machines, unbalanced operation, dynamic load characteristic, application factors, variable frequency motors, motors for blower applications, efficiency of high-slip units, environmental factors, ordering a motor efficiency. SEPTEMBER 1959 PAGE 51

MOTORS, HIGH TEMPERATURE
Three-piece graphite bearing solves design problems.
NOVEMBER 1961 PAGE 26

MOTORS, HIGH TEMPERATURE AIR
Pressure relief design produces fast reponse. NOV.-DEC. 1957 PAGE 32

MOTORS HI-TORQUE ACTUATOR
Converts armature vibration of an ac operated solenoid to rotary motion.
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MOTORS, INCHWORM
Magneto stricture forces actuate linear feed mechanism. APRIL 1958 PAGE 24

MOTORS, INDUCTION, FRACTIONAL H.P.
Factors in design of efficient miniature motors for aircraft systems.
JANUARY 1962 PAGE 24

MOTORS, LINEAR
Unlimited stroke without hydraulics or pneumatics. JUNE 1961 PAGE 15

MOTORS, LINEAR POSITIONING
New control device translates simple inputs into accurate linear motion.
FEBRUARY 1960 PAGE 14

MOTORS, PRINTED CIRCUIT
Development of two-sided printed circuit boards with reliable plated through holes makes the cost, quality and engineering advantages of printed circuitry available for dc motor designs.
APRIL 1959 PAGE 21

MOTORS, STEPPER, LOW-COST
Magnetic detent reduces shock load.
JULY 1959 PAGE 4

MOTORS, TIMING, NOISELESS
Lifetime Continuous Operation from Spring Loaded Packing Gland.
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MULTIPLIER-DIVIDER, ANALOG
Plug in solid state unit replaces instrument servo in analog computation.
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NETWORKS, PHASE IN LEAD LAG
Simple curves provide quick solution to lead, lag problems. JULY 1960 PAGE 33

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Ground facility simulating free space boresights antenna clusters to within 0.01 degrees angular error.
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Part II: Optical-inertial navigation, space vehicles, future of Newtonian navigation.
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Practical techniques for determining the sources of noise, controlling and suppressing noise and separating noise from signals. SEPTEMBER 1962 PAGE 64

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NONLINEAR ANALYSIS OF CONTROL LOOP FOR A STABILIZED MOUNT
"Torque picture" superimposed on phase plan allows prediction and control of responses. DECEMBER 1960 PAGE 26

NONLINEAR SYSTEMS
Dr. Norbert Wiener demonstrates methods of determining the contents of a "black box" so long as one knows what is going into the box and what is coming out. APRIL 1959 PAGE 26

NYLON ADHESIVE
Quick-setting high strength bonds with only contact pressure.
JULY 1960 PAGE 31

OPTICS — 3-D Viewing
Lenticular screen simulate 3-d images without the aid of optical devices.
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OSCILLATOR, AMMONIA-TYPER MASER
Better than one part in one billion stability. APRIL 1958 PAGE 35
OSCILLATOR, SWEEPING
Accurate low frequency testing using RF techniques. JUNE 1961 PAGE 29
OSCILLOSCOPE, DIGITAL READING
Scope-output can be fed directly to digital equipment for recording or analysis.
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New look in nameplates and panels.
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PACKAGE TECHNIQUES FOR SYSTEMS DESIGNS
Beacon transmitter for satellite and space vehicles. Subminiature rate gyro package. One million parts fit into one cubic foot by microminiature technique. Electronic "sardine sandwich" package.
APRIL 1959 PAGE 40
PACKAGING, MODULAR
Universal incremental modules combine high structural strength with good economic maintainability.
MAY 1961 PAGE 36
PACKAGING, SYSTEMS
Greater damping of resonant vibrations achieved without the use of vibration isolators. MARCH 1960 PAGE 22
PACKAGING, WIRE
Molded fiberglass harness cuts space, improves performance.
AUGUST 1959 PAGE 24
PACKAGES, WELDED, HIGH DENSITY
Welded Cordwood Packaging Technique as Used in Polaris Digital Computer Extended to Analog Systems Applications.
AUGUST 1961 PAGE 24
PARABOLOIDAL SHELL, MOMENTS OF INERTIA
Solution of the chief problem in the analysis of a radar antenna drive for a parabolic reflector.
NOVEMBER 1959 PAGE 45
PARAMETRIC AMPLIFIERS
Tiny microwave device doubles range of radar systems. AUGUST 1959 PAGE 22
PARTS DESIGN AND PRODUCTION
One computer program provides both automatic drafting and production of machine parts. APRIL 1961 PAGE 39
PATCH PANEL, ELECTRICAL
Quick connect disconnect for missile fire control. MAY 1959 PAGE 4
PERSISTOR, THE
New miniature, bi-metallic printed circuit for switching and signal storage.
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PHASE COUPLING
Phasing synchros fast.
SEPTEMBER 1959 PAGE 14
PHOTO AND INFRARED DETECTION
Physical principles, generation, transmission collection, detection, measuring illumination, semiconductor detectors, application techniques. JULY 1961 PAGE 41
PHOTOELECTRIC DEVICE
Solid state system based on radioisotope instead of light.
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PHOTOELECTRIC TEMPERATURE CONTROL
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PHOTOGRAPHY, HIGH SPEED
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DECEMBER 1958 PAGE 20
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Density vs wavelength curves of spectrum displayed on oscilloscope.
SEPTEMBER 1960 PAGE 42
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PNPN switch performs dual role of light sensing and load actuating.
JULY 1961 PAGE 12
PIEZOELECTRIC COMPOUNDS
Electromechanical coupling coefficient four times that of quartz.
AUGUST 1960 PAGE 71
PILOT LIGHT, SELECTION BY LAMP TYPE
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PLASMA SPRAY
Coating technique vaporizes tungsten, converts it from gaseous to plasma state and sprays it on cold steel.
NOVEMBER 1958 PAGE 40
PNEUMATIC ACTUATOR, HIGH TEMPERATURE
Performance of an air motor at 1200°F.
JANUARY 1960 PAGE 18
PNEUMATIC CONTROL, PRESSURE
Accurate regulation by a digital servo network. OCTOBER 1960 PAGE 48
POLISHING, CHEMICAL AND ELECTRO-CHEMICAL
Time-saving techniques applied to removal of burrs from machined metal parts solve some difficult problems.
OCTOBER 1959 PAGE 43
POT, AIRCRAFT PANEL
Used to control or adjust aircraft instrument package.
DECEMBER 1958 PAGE 16
POT, CONTINUOUS FUNCTION GENERATOR, (FILM POT TAP)
"Zero" tap width generates continuous function. JULY 1960 PAGE 8
POT, FILM, MINIATURE 10-TURN
Inverting the mechanical functions of components results in 0.025% linearity in ¼ inch volume.
FEBRUARY 1962 PAGE 14
POT, LEAD SCREW
Tiny hi-temp trimpot redesigned for reliability under extreme military environments. DECEMBER 1958 PAGE 14
POT, ONE-INCH, WITH 0.01 LINEARITY
New wiper design removes many limitations on pot performance.
JUNE 1961 PAGE 16
POT, SMALL MEGOHM
New resistance winding design produces 3.5 megohm resistance in a 2-inch diameter pot using 1 mil wire.
DECEMBER 1958 PAGE 12
POT, TRIMMER
So small — 16 to the square inch, 500 per lb. APRIL 1958 PAGE 12
POT, VERNIER
10-turn resolution in 2-turn size.
FEBRUARY 1959 PAGE 21
POT PERFORMANCE, OPTIMUM, THROUGH COMPROMISE
How and why certain potentiometer characteristics are obtainable and others are impractical. JULY 1962 PAGE 24
POT WINDING AND SPACING CONTROL
Microphoto with 60-times magnification shows extreme parallelism of wires and spacing produced winding equipment.
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POTENTIOMETER RECORDER, MULTIPOINT
Replacing newly designed terminal block including integral cold junction compensation adapts units to change in thermocouple type. DECEMBER 1958 PAGE 12
POTENTIOMETER RESISTANCE MEASUREMENTS
How to avoid burn-out caused by measuring current supplied by a wheatstone bridge. NOVEMBER 1962 PAGE 39
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The importance of drawing on manufacturer's experience in writing specs for special designs. MARCH 1959 PAGE 17
POTENTIOMETER STANDARDS—DEFINITIONS AND REQUIREMENTS
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POTENTIOMETER TESTING
Fast automatic checkout of performance characteristics.
SEPTEMBER 1961 PAGE 27
POTENTIOMETERS
High temperature pots. Intermediate temperature units, 300°—500°C units.
JANUARY 1960 PAGE 41
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POTENTIOMETERS, ELECTRO-OPTICAL
Light source replaces conventional wiper arm. SEPTEMBER 1961 PAGE 15
POTENTIOMETERS—LONG LIFE FILMPOT
Progressive rather than catastrophic nature of failure in carbon film pots permits analysis of events leading to failure and reveals solution of potentiometer design problem. OCTOBER 1958 PAGE 8
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POTENTIOMETERS, PRECISION
Do's and Don'ts in the use of pots. Checklist of design tips for pot users based on suggestions from the Precision Potentiometer Manufacturers' Ass'n.
JULY 1961 PAGE 37
POTENTIOMETERS PRECISION
On-the-scene report of problems and suggested solutions in the applications of precision potentiometers in military electronic and electromechanical equipment, as presented at the Precision Potentiometer Manufacturers Association in Florida. APRIL 1962 PAGE 44
State-of-the Art Report—roundup of new military and commercial potentiometers recently made available by members of PPMA. APRIL 1962 PAGE 56
POTENTIOMETERS, PRECISION, BUYERS' GUIDE DECEMBER 1958 PAGE 60
POTENTIOMETERS, PRECISION, FORD INSTRUMENT COMPANY'S VENDOR SYMPOSIUM ON
A step in the right direction toward improving user-vendor relationships in the procurement of any kind of a component or sub-system.
SEPTEMBER 1962 PAGE 28
POTENTIOMETERS, PRECISION, MIL SPEC FOR, REVISED FOR EXPANDED USE
Qualification and preproduction requirements, considered by the pot industry to be excessively expensive, are being removed or modified in the next revision of MIL-R-12934. JULY 1962 PAGE 19
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POWER, AC, FOR AIRCRAFT
AC electrical systems in aircraft are lighter and have lower transmission losses than dc systems with the exception of solenoid valves that operate bet-

ter on dc. Here is a new solenoid valve that provides its own source of dc power when connected to an aircraft ac supply to overcome this exception.
JULY 1958 PAGE 4

POWER SUPPLY, DC REGULATED
Several considerations, open loop and closed loop regulation; types of supplies, specifications, summary data charts, new power supplies. JULY 1960 PAGE 42

POWER SUPPLY, SEMICONDUCTOR
Magnetic circuit regulates high-voltage dc output. SEPTEMBER 1960 PAGE 38

POWER SUPPLY, TRANSISTOR REGULATED, AS A FEEDBACK CONTROL SYSTEM
How to design transistorized power supplies that function accurately under severe conditions. JUNE 1958 PAGE 14

POWER SUPPLIES, SECOND ORDER EFFECTS IN AC TO DC
Analysis of some characteristics usually not considered in power supply specification. JANUARY 1961 PAGE 24

POWER SUPPLIES, PREREGULATED
Forward biased diodes as voltage references. FEBRUARY 1961 PAGE 30

POWER SYSTEMS, SPACE
Design characteristics and problem areas in some important solar power system components. SEPTEMBER 1960 PAGE 30

POWER TRANSMISSION PROGRESS
Maintenance free magnetic clutch. Packaged electric clutch and sheave simplifies no-load starting. APRIL 1959 PAGE 12

POWER UNITS, MISSILE AUXILIARY
Electric and hydraulic power source with maximum reliability, simplicity and flexibility for missile guidance and control.
JUNE 1959 PAGE 20

PRINT READER, AUTOMATIC
Optical technique permits translations at high speed. OCTOBER 1960 PAGE 56

PRINTER, ELECTRONIC CALIBRATES METER SCALES
Automatic system prints meter scale within 0.5% accuracy on dimensionally stable film. JANUARY 1962 PAGE 34

PRINTER, READOUT, DIGITAL
Solenoid-lever design converts voltage pulse to lateral motion.
SEPT.-OCT. 1957 PAGE 52

PRODUCT STYLING, INDUSTRIAL
Industrial design eases manufacturing problems and reduces production costs.
JUNE 1960 PAGE 64

PRODUCTION TECHNIQUES, IMPACT OF NEW COMPONENTS
Case histories illustrate how newness of transistorized equipment, rather than transistors themselves, causes production problems. AUGUST 1959 PAGE 6

PROGRAMMER, ELAPSED TIME
Three design approaches for controlling the closing of contacts by the joint position of timing drums.
SEPTEMBER 1960 PAGE 25

PUMP, GEAR
Cartridge construction with hydraulically and thermally controlled positive clearance frees pump from mechanical drag, permitting operation at high speed.
NOVEMBER 1958 PAGE 14

PUMP, SALT WATER
Bypassing two old problems: seal and corrosion. NOV.-DEC. 1957 PAGE 38

PUMP CONTROL, PNEUMATIC-ELECTRIC
Variable-speed, pulley-drives regulate pump rates. JAN.-FEB. 1958 PAGE 33

QUARTZ, SYNTHETIC
Low-cost crystals can be made in almost any quantity and size.
JANUARY 1961 PAGE 31

RADAR, FREQUENCY DIVERSITY
Improved radar displays.
MARCH 1958 PAGE 32

RADIATION AND MATERIALS
Part I: Applications of interaction between radiation and matter. David Bandel, Staff Columnist.
JANUARY 1959 PAGE 32
Part II: Effects of high level radiation on mechnical and electrical properties of materials. David Bandel, Staff Columnist.
APRIL 1959 PAGE 36

RADIOISOTOPES, TRACING AND CHASING WITH
Materials progress report. Ronald C. Vickery, Staff Columnist.
MARCH 1958 PAGE 41

RADIOSONDE, HYPSOMETER
Liquid-filled vacuum bottle measures high-altitude pressure.
JANUARY 1959 PAGE 21

READER, AUTOMATIC PRINTER
Optical technique permits translations at high speed. OCTOBER 1960 PAGE 56

RECORDERS, CHART
Marking methods and papers, XY recorders, event recorders, high speed recorders, summary tables of performance characteristics of manufacturers' units.
JUNE 1962 PAGE 35

RECORDERS, DIGITAL INCREMENTAL
Unit plots directly from computer output.
OCTOBER 1960 PAGE 28

RECORDERS, HI TEMP
New developments in recording oscillograph for aviation testing.
APRIL 1958 PAGE 51

RECORDERS, MAGNETIC, FOR MISSILE TEST
Photoelectric transducers solve speed and tension control problems in tape drive.
MAY 1960 PAGE 36

RECORDERS, MISSILE TAPE
Immersing tape in liquid reduces inertia.
NOVEMBER 1961 PAGE 23

RECORDERS, VIDEO, CAPTURE RADAR TRACKING SIGNALS
New recording method permits higher frequency radar signals to be packed on magnetic tape.
NOVEMBER 1959 PAGE 17

RECTIFIERS, SILICON CONTROLLED, FIRING CIRCUITS
General performance, usage, turn-off, practical problems in gating SCR's firing techniques. MARCH 1962 PAGE 13

RECTIFIERS, SILICON CONTROLLED, SURVEY OF FIRING CIRCUITS FOR
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RECTIFIERS, SILICON POWER, TECHNIQUES IN THE APPLICATION OF
Ratings; forward drop; reverse voltage ratings; thermal properties; protection techniques; overload protection; overvoltage protection; reliability.
FEBRUARY 1960 PAGE 30

RECTIFIERS, TRINISTOR CONTROLLED, IN CONVERTERS, INVERTERS, FREQUENCY CHANGERS OCTOBER 1962 PAGE 54

REDUNDANT SYSTEMS, DEVELOPMENT AND UTILIZATION OF
Failure rates of redundant systems can be thousands of times lower than for conventional systems.
SEPTEMBER 1959 PAGE 28

REGULATOR, COPTOR ROTOR
Servo system maintains constant rotor speed. JANUARY 1959 PAGE 21

RELAY CONFERENCE, NARM'S TENTH
Pros and cons in reliability, Darnell recommendations, fallacies in life testing, causes of relay failure, predicting product performance, contact chatter indicator, low energy level testing, user applications, heat transfer in relay design, current-state-of-the-art, relay news.
JULY 1962 PAGE 48

RELAY CONTACTS, "WEDGE-ACTION"
Point-to-point wiping contacts tested under dry-circuit conditions achieve a miss rate average of 1 miss in 50 million contact operations. APRIL 1962 PAGE 33

RELAYS, ELECTROMAGNETIC, SELECTION AND APPLICATION OF
Information taken from 30 years of published data on relay applications.
NOVEMBER 1962 PAGE 52

RELAYS, MAGNETIC LATCHING
Push-pull action provides secure contact mating NOVEMBER 1961 PAGE 31

RELAYS, MAGNETIC TOGGLE
"Magnetic detenting" holds relay in either of its two normal positions dispensing with mechanical or electrical holding power.
NOVEMBER 1958 PAGE 12

RELAYS, METER
A simple and inexpensive method for controlling rate and magnitude of a change in any variable that can be measured electrically.
APRIL 1958 PAGE 10

RELAYS, METER, CONTINUOUS READING
Pointer trips v-shaped toggle switch.
SEPTEMBER 1959 PAGE 24

RELAYS, PERMANENT MAGNET
Constant force on armature eliminates adjustments. OCTOBER 1960 PAGE 40

RELAYS, POLARIZED, SYMBOLS FOR DESCRIBING
Wiring diagrams that define relay operation and wiring connections.
JANUARY 1962 PAGE 37

RELAYS, PROGRAM
Moly-disulfide-filled sintered-nylon cams and ratchets withstand heavy shock and wear. NOVEMBER 1960 PAGE 38

RELAYS, REED
Use of short pole piece with longer moving reed permits higher operating speeds of magnetic reed switches.
AUGUST 1960 PAGE 13

RELAYS, SENSITIVE
Basic relay parts. Magnetic circuit fundamentals. AC vs. dc relays. Polarized rearrangements. Relay coils. Hi-speed oplays. Effect of miniaturization. Contact eration. Low-speed operation. Construction features. Environmental requirements. Relay contacts. Dry circuits.
APRIL 1959 PAGE 45

RELAYS, SMALL HERMETIC, THERMALLY RATING
Details of the ways in which voltage ratings can become more meaningful and useful to all who use small hermetically sealed relays. OCTOBER 1962 PAGE 22

RELAYS, TIME DELAY
Thermal delays, pneumatic & hydraulic delays, electronic delays, clock time delays and copper-slug delay units.
FEBRUARY 1962 PAGE 39

RELIABILITY
Three simple graphs—and you can evaluate most equipment reliability.
JAN.-FEB. 1958 PAGE 61

RELIABILITY, A PRACTICAL PROGRAM FOR
How to combine analysis with experiments to determine equipment reliability economically. MAY 1959 PAGE 17

RELIABILITY, CAPACITOR
Accurate repetitive measurements for improved test circuit boards.
FEBRUARY 1961 PAGE 36

RELIABILITY, DESIGN REVIEWS FOR
Want to achieve greater ability in systems and components design and cut costs at the same time? Here's an easily administered design review program successfully used by RCA's Missile and Surface Radar Department.
JULY 1958 PAGE 28

RELIABILITY, HIGH ASSURANCE, COST FACTORS IN COMPONENT PART PROCESSING PROGRAMS
Economics of testing the reliability of hundreds of thousands of components for thousands of hours.
MARCH 1959 PAGE 4

RELIABILITY, TRANSISTOR
"Helium Bomb Test" improves the detection of leakage; greater product uniformity results from new process.
APRIL 1961 PAGE 38

RELIABILITY AND MEASLES
Color-coded schematic chart is a handy aid in pinpointing parts failures.
AUGUST 1962 PAGE 32

RELIABILITY TESTING
A specific technique for determining if your equipment is adequately engineered.
MARCH 1958 PAGE 50

REMOTE CONTROL, CODE RINGS IN
Translation of USSR technical report.
JAN.-FEB. 1958 PAGE 73

RESEARCH EVALUATION, COMPREHENSIVE APPROACH TO
Judging past performance for the purpose of guiding a future action.
MARCH 1958 PAGE 56

RESISTORS, CURRENT PULSE VIEWING
Device converts magnetron current into voltage pulses for presentation on cathode ray tube. MAY 1958 PAGE 26

RESISTORS, MOLECULAR STRUCTURED
Micro-module ceramic wafers have mean-time-to-failure of 100,000 hours.
JUNE 1959 PAGE 30

RESOLVERS, ELECTRICAL
Part I: Fundamentals of resolver performance; the ideal resolver; nonideal aspects of performance; manufacturing errors; application factors; equivalent circuit; Compensation circuits; non-booster compensation; resistance-type resolvers; sine-cosine generators.
FEBRUARY 1960 PAGE 49
Part II: Summary of induction resolver characteristics. OCTOBER 1960 PAGE 76

RESOLVERS, POTENTIOMETER
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RESOLVERS AND SYNCHROS
Solid state trigonometric function generators and electrical two-speed synchro systems. JUNE 1960 PAGE 16

RESONATORS, HIGH TEMPERATURE
Electrolysis of quartz crystals removes the major causes of energy absorption at high temperatures.
FEBRUARY 1962 PAGE 34

RODS, PISTON, MACHINE
Tenfold increase in life of working parts.
JULY 1961 PAGE 32

ROTARY DEVICES, RELIABILITY STRESS ANALYSIS
How to predict the reliability of motors, blowers, generators, dynamotors, synchros and resolvers. OCTOBER 1958 PAGE 24

RUBIDIUM MAGNETOMETER
A new method of indicating the strength of magnetic fields based on light absorption by rubidium vapor.
JULY 1958 PAGE 22

RUSTING OF IRON, NEW THEORY
Hydrogen ions from water vapor cause destructive reactions.
DECEMBER 1960 PAGE 56

SATELLITE TRACKING
Digital equipment provides accurate tracking data. JANUARY 1961 PAGE 28

SCAN CONVERSION EQUIPMENT
TV presentation of radar information.
MARCH 1958 PAGE 34

SEAL, DIAPHRAGM-BELLOWS
Rolling diaphragm principle underlines many new piston-cylinder designs.
OCTOBER 1959 PAGE 4

SEAL, HERMETIC
Fully serviceable mechanical seals for hermetic and hi-vacuum packages.
OCTOBER 1960 PAGE 52

SEAL, OIL
Enclosed sealing element eliminates leakage. AUGUST 1960 PAGE 20

SEAL, PORCELAIN TO ALUMINUM
Mechanically reliable, vacuum-tight seals result from bringing high-purity molten aluminum into contact with alumina-silica ceramics under carefully controlled temperature and temperature-change conditions. AUG.-SEPT. 1958 PAGE 32

SEALS, POWER FEED
For high pressure high temperature helium. APRIL 1962 PAGE 28

SEISMIC SYSTEM, NATURAL FREQUENCY AND PHASE RELATIONS
OCTOBER 1960 PAGE 22

SEMICONDUCTOR DEVICES
New developments in true-power silicon transistors, power switches, solid state multiplier and a miniature rectifier that operates red hot. APRIL 1958 PAGE 14

SEMICONDUCTOR DEVICES
Radical improvements in commercial silicon transistors, temperature probes, voltage regulators and germanium power transistors. NOVEMBER 1958 PAGE 10

SEMICONDUCTOR DEVICE
New material in tunnel diode design permits operation above 4000 MC.
APRIL 1960 PAGE 25

SEMICONDUCTOR DEVICES
An authoritative appraisal of the present and future solid-state industry.
JULY 1960 PAGE 37

SEMICONDUCTOR DEVICES IN ELECTROMECHANICAL ENGINEERING
Part I: General properties, application problems, responsibilities of electromechanical engineers in a typical development involving semiconductors.
MARCH 1961 PAGE 67
Part II: Non mathematical discussion of solid state theory to provide the electromechanical engineer with the minimum background needed to understand how semiconductors work and the factors affecting their performance.
APRIL 1961 PAGE 59
Part III: Thermistors, voltage-sensitive varistors, Zener diodes, point contact rectifiers. JUNE 1961 PAGE 45
Part IV: Methods of testing and selecting semiconductor devices. Elementary testing principles, additional test considerations, semiconductor parameters, transistor voltage rating, electrical test procedures, commercial test equipment.
SEPTEMBER 1961 PAGE 21
Part V: Quantum Mechanics — photoelectric effect, the Bohr atom, spectra, wave particle duality, wave mechanics, the hydrogen atom, periodic table, solid state physics.
AUGUST 1962 PAGE 34

SEMI-CONDUCTOR LAYERS, THIN DIELECTRIC
Translation of USSR Technical Report.
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SEMICONDUCTORS, FURNACES FOR
The secret of furnace design for a rapidly changing product.
SEPT.-OCT. 1957 PAGE 50

SEMICONDUCTORS, POWER, HEAT TRANSFER IN
Design tips for proper dissipation of heat from power units.
AUGUST 1962 PAGE 30

SEMICONDUCTORS, POWER, RECOMMENDED MOUNTING PROCEDURES FOR
How to obtain maximum rating for a given mechanical configuration.
DECEMBER 1961 PAGE 38

SENSING, ELECTRONIC, THE DIRECT APPROACH
Electronic sensing replaces conventional limit switch. AUGUST 1959 PAGE 18

SENSITOMETER, XENON-FLASHLAMP
Electronic flash supplies remarkably constant light source that approximates daylight quality without use of filters and allows study of film and development characteristics in the range of high speed photography. AUG.-SEPT. 1958 PAGE 24

SENSOR, ANGLE, PHOTOELECTRIC
Simple, low-cost device is 200 times more sensitive than the most expensive optical instruments. NOVEMBER 1961 PAGE 12

SERVO AMPLIFIER, HIGH POWER SCR
Saturating reactor slaved to an SCR not only acts as a switch but also as an autotransformer to reduce the voltage rating on the SCR. JUNE 1962 PAGE 20

SERVO CONTROL
Direct drive eliminates backlash in high performance servos.
JAN.-FEB. 1958 PAGE 24

SERVO DESIGN CHARTS
Part I: Timesaving servo charts, important design data in compact and easy to read form, with uniform notations. Helps solve by inspection many problems that formerly required tedious calculation by trial and error. JULY 1958 PAGE 38
Part II: Charts for solution of servo design problems by inspection.
NOVEMBER 1958 PAGE 44
Part III: Bandwidth for a pair of complex poles. MAY 1959 PAGE 24

SERVO MODULATORS AND DEMODULATORS, FILTERS FOR
Notch filters reject unwanted frequencies without influencing servo information.
MAY 1961 PAGE 14

SERVO MOTOR APPLICATION
How to represent the operation of a servomotor mathematically in system block diagrams.
OCTOBER 1958 PAGE 18

SERVO MOTOR STANDARDS
Standard definitions proposed by SAE in APR 497.
Tentative SAE standard dimensions.
Tentative SAE standard specifications.
OCTOBER 1958 PAGE 41

SERVO MOTORS
Part I: A-C Instrument — key facts on ac instrument servo motors with construction. Covers basic concepts, types standards, formulas and tables of performance characteristics of commercially available units and buyer's guide.
OCTOBER 1958 PAGE 33
Part II: Gearhead selection — general construction, performance factors in selection, gear ratio, backlash, speed and torque ratings, bearings, lubrication, friction, inertia and miscellaneous application factors. APRIL 1961 PAGE 65
Part: III: Summary of servomotor characteristics. OCTOBER 1961 PAGE 50

SERVO MOTORS, AC, BASIC CONCEPTS AND APPLICATIONS FOR
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SERVO MOTORS, AC INSTRUMENT, TYPES OF
OCTOBER 1958 PAGE 37

SERVO MOTORS, COMMON SENSE ABOUT SPECIFYING IMPEDANCE TOLERANCES
How to specify a motor that meets your needs at lowest cost.
DECEMBER 1961 PAGE 40

SERVO MOTORS, FIGURES OF MERIT
OCTOBER 1958 PAGE 46

SERVO MOTORS, INSTRUMENT, BUYERS' GUIDE FOR DECEMBER 1958 PAGE 60

SERVO MOTORS, INSTRUMENT, SUMMARY CHARTS
Mechanical and electrical performance summary charts for commercial instrument servo motors. OCTOBER 1958 PAGE 44

SERVO MOTORS, LINEAR, FUNDAMENTAL FORMULAS FOR OCTOBER 1958 PAGE 46

SERVO MOTORS, MINIATURE, SIMPLIFIED
Replacing the conventional laminated, slotted stator and its complex winding array with a solid magnet structure and a single bobbin-wound coil per phase reduces cost but not performance of miniature servomotors.
OCTOBER 1958 PAGE 14

SERVO OUTPUT TRANSDUCER WITH INDEPENDENT ANGLE REFERENCE
Transducer module engages servo gear train at specified servo position and

returns to specified position in response to external command signals.
DECEMBER 1958 PAGE 12

SERVO PACKAGES, MINIATURE
Standard packages, basic components, common variations, construction features, alternative construction, indicator-type devices, servometers, servo-amplifiers, gearheads, synchros, pots, magnetic clutches, additional elements, buying a package. JUNE 1960 PAGE 70

SERVO TESTING, AUTOMATIC
Unit plots Bode, Nichols and Nyquist responses within twelve minutes.
JANUARY 1961 PAGE 38

SERVO SYSTEMS, DIGITAL
Stepper motors may replace ac and dc servo motors.
SEPTEMBER 1960 PAGE 40

SERVO VALVE AMPLIFIER
Requirements for a good all around design. SEPTEMBER 1961 PAGE 14

SERVO VALVE AMPLIFIERS
Some major design requirementss and how to provide them.
NOVEMBER 1961 PAGE 24

SERVO VALVES
Classification and description of common-types, advantages and disadvantages and typical applications of valve-controlled systems, servo valve terminology, dynamic characteristics and transfer functions, selection factors, nomographs for selecting optimum servo valve, description and performance characteristics of commercially available units.
NOVEMBER 1960 PAGE 55

SERVO VALVES, SENSITIVE CONTROL
Single-stage unit with two moving parts — torque motor armature and swing plate — responds rapidly to minute signals and eliminates sticking, scoring and jamming. NOVEMBER 1958 PAGE 22

SERVO WINDINGS FOR TRANSISTOR AMPLIFIER DRIVE
How to eliminate the amplifier output transformer by using the motor control winding as the transformer primary.
OCTOBER 1958 PAGE 10

SERVOMASTERS, DIGITAL
Stepper motors may replace ac and dc servo motors. SEPTEMBER 1960 PAGE 40

SERVOMECHANISM, SPECIFYING AN INSTRUMENT
Black box treatment of servomechanisms considering over-all performance requirements. NOVEMBER 1959 PAGE 32

SERVOS, CURRENT NULLING
Some advantages of parallel summation in servo computer servos.
JULY 1959 PAGE 19

SERVOS, GROUP REDUNDANT
Failure detection and switching circuits for redundant systems.
JUNE 1961 PAGE 24

SERVOS, INSTRUMENT — A Simplified Technique in Analysis
A two-parameter system can be used to analyze loop performance of instrument servos far more easily than conventional techniques will allow.
FEBRUARY 1962 PAGE 36

SERVOS, LINEAR, DESIGN PROCEDURES FOR SATURATING
A block diagram method of analyzing and compensating a saturization servo.
OCTOBER 1959 PAGE 35

SERVOS, QUADRATIC REJECTION UNIT
A low-cost, stable, electromechanical device for high gain servos.
JUNE 1959 PAGE 38

SHIFT REGISTER, TWISTOR
Single magnetic wire stores pulses when subjected to magnetizing field.
JANUARY 1959 PAGE 8

SLIP RINGS
Parameters and configurations of slip ring assemblies and problems and limitations to be considered in specifying a design.
NOVEMBER 1961 PAGE 45

SOLAR CELLS, SILICON, DETECT RADIATION
New semiconductor layer arrangement produces a simple device for measuring high intensity radiation.
JULY 1962 PAGE 44

SOLENOID, DC, OPERATION FROM AC SOURCE
Eliminates the necessity for bulky separate DC supplies or the need for rectifier circuits. SEPTEMBER 1962 PAGE 56

SOLENOID VALVES, HOW TO SPECIFY
A check-list of electrical and mechanical application requirements that affect a valve manufacturer's proposals and recommendations for a specific design.
JANUARY 1959 PAGE 40

SORTER, CODED DOCUMENT
Combining mechanical guidance, photoelectric reading and electromechanical memory, this low-cost data processing system reads and sorts coded single-page paper documents of miscellaneous size with dependable accuracy.
FEBRUARY 1962 PAGE 26

SPECTROSCOPY
VHF radio waves measure behavior of electrons. APRIL 1958 PAGE 53

SPECTROSCOPY, INTERFERENCE
Sensitivity gain of more than 1000 in new infrared spectrometer.
JULY 1961 PAGE 26

SPECTOGRAPH, DIRECT READING
Servo control aligns and stabilizes spectrum lines. JANUARY 1959 PAGE 18

SPEED CONTROL, LOW COST
Transistorized tachometer with meter relay control.
SEPTEMBER 1959 PAGE 15

SPLICES, INSULATED, EVALUATING
Splice performance is rated quantitatively on how the splice compares dimensionally, mechanically and electrically to the length of cable it replaces.
JUNE 1958 PAGE 44

SPRING, CONSTANT-TORQUE
Zero-gradient spring now adapted to torque problems. APRIL 1962 PAGE 32

SPRING, MODULAR — Return for Servo Packages
Floating spring design eliminates solid stop pin and permits 345 degrees rotation in either direction.
APRIL 1962 PAGE 18

SPRING DESIGN
A logical step-by-step procedure that eliminates tedious calculations.
Part I: Precision Compression Springs SEPT.OCT. 1957 PAGE 88
Part II: Precision Extension Springs NOV.-DEC. 1957 PAGE 82

SPRING DESIGN, CASE HISTORIES
Consulation with specialists at spring manufacturers is often an easy way out of spring design problems.
JUNE 1958 PAGE 36

SPRING RATE CALCULATOR
Quick calculations for seven types of flat springs. NOVEMBER 1962 PAGE 32

SPRING SYSTEMS, DOUBLE MASS
Useful transmissibility curves for designing high speed track carriages.
JUNE 1960 PAGE 67

SPRINGS: HOW TO DEAL WITH HIGH TEMPERATURES
By proper choice of materials and by certain design changes and processing modifications you can now obtain satisfactory spring performance under high-temperature operating conditions.
AUG.-SEPT. 1958 PAGE 38

STORAGE, MAGNETIC CORE, SYSTEM
Standard memory building blocks make up low-cost magnetic core storage system with random access, for small computers and special purpose data handling.
NOVEMBER 1958 PAGE 32

STORAGE AND CONTROL, DIGITAL
Servo systems without active elements use digital shaft sensing devices.
DECEMBER 1959 PAGE 26

STRAIN GAGE, ZERO LENGTH UNBONDED
New configuration simplifies transducer design. FEBRUARY 1959 PAGE 18

STRESS AND STRAIN
"Built-in" computer eliminates tedious calculations. MAY 1961 PAGE 43

SUPPRESSORS, EXPLOSION
Automatic system snuffs out accidental blasts. DECEMBER 1960 PAGE 32

SWITCH SELECTION AIDS
JULY 1959 PAGE 8

SWITCHES, AIR DENSITY
Monitoring artificial atmosphere in aircraft and missile systems.
OCTOBER 1959 PAGE 8

SWITCHES, CYCLE TIMERS
Special replaceable switches and easily adjustable cams provide advantages for many applications. APRIL 1962 PAGE 30

SWITCHES, ELECTROMECHANICAL
Part I: Selection Procedures, selection factors, environmental factors, contacts, contact resistance, types of switches, rotary selector switches, printed circuit switches. AUGUST 1959 PAGE 35
Part II: Precision switches, heavy duty limit switches, pressure switches, thermal switches, motor protection, miscellaneous switch types, mercury switches, crossbar switches. OCTOBER 1959 PAGE 57
Part III: Coaxial Switches: Application and selection factors; design features; commercially available units; modifications of standard types.
NOVEMBER 1959 PAGE 63

SWITCHES, ELECTRONIC DECIMAL
By varying associated circuitry, a new switch can perform many digital functions.
MARCH 1960 PAGE 10

SWITCHES, FERRITE REED
Microsecond memory drives metallic contacts. APRIL 1960 PAGE 32

SWITCHES, N-DIGIT DECADE
"Combination-lock" memory switch stores multiple digit numbers.
OCTOBER 1960 PAGE 31

SWITCHES, PROXIMITY
Application in an automatic drill to permit drilling deep holes without drill breakage.
NOVEMBER 1958 PAGE 41

SWITCHES, ROTARY, SOLID STATE
Light-sensitive PNPN eliminates contact noise and wear.
MARCH 1962 PAGE 28

SWITCHES, SAMPLING, ELECTROMECHANICAL
A unique contact mechanism for a low noise, long life rotary commutator.
NOVEMBER 1962 PAGE 40

SWITCHES, SELECTING FOR GROUND SUPPORT EQUIPMENT
A review of the important criteria in selecting switches for GSE environments.
OCTOBER 1962 PAGE 42

SWITCHES, SILICON PNPN CONTROLLED
New device achieves high gain, high speed, medium power switching beyond that possible with present-day transistors.
APRIL 1959 PAGE 12

SWITCHES, TINY SAMPLING
Development of contact pins with exceptional durability with reduced noise.
NOVEMBER 1958 PAGE 20

SWITCHGEAR, METAL-CLAD
Clean sweep re-design of 4160-volt circuit breakers. JUNE 1960 PAGE 20

SUPERCONDUCTIVITY
Applications now possible in electronic circuits. SEPT.-OCT. 1957 PAGE 98

SYNCHROS AND RESOLVERS
Solid state trigonometric function generators and electrical two-speed synchro systems. JUNE 1960 PAGE 16

SYSTEMS DESIGN, PACKAGE TECHNIQUES FOR
Beacon transmitter for satellite and space vehicles. Subminiature rate gyro package. One million parts fit into one cubic foot by microminiature technique. Electronic "sardine sandwich" package.
APRIL 1959 PAGE 40

SYSTEMS NOISE FIGURES, GRAPHICAL CALCULATIONS
MAY 1961 PAGE 56

SYSTEMS PACKAGING
Greater damping of resonant vibrations achieved without the use of vibration isolators. MARCH 1960 PAGE 22

TACHOMETER, CALCULATING NO LOAD OUTPUT OF DRAG CUP
Complete procedure for determining performance of a unit before it is built.
NOVEMBER 1961 PAGE 34

TACHOMETER, STROBOSCOPIC
Flash tube's high white light intensity and short duration flashes provide sharp clarity of minute detail for motion analysis. JANUARY 1961 PAGE 34

TAPE, ELECTRICAL SHIELDING
Aluminum foil laminated to polyester film eliminates cross-talk.
JULY 1959 PAGE 31

TAPE CONVERTER, PAPER-TO-MAGNETIC
Analysis of design problems in the development of a direct, high-speed computer input system.
APRIL 1961 PAGE 24

TAPE RECORDER, 14-CHANNEL INSTRUMENTATION
Differential capstan drive holds magnetic tape on constant tension against heads eliminating variations that cause wow and flutter. AUG.-SEPT. 1960 PAGE 30

TELEMETRY
Precision voltage monitor for accurate data transmission.
MARCH 1958 PAGE 12

TELEMETRY, HIGH VOLUME
Galvanometer light beams and photomultiplier tube replace rotating wiper-arm assemblies and chopper-stabilized amplifiers in time-sharing multiplexer.
JUNE 1959 PAGE 32

TELEMETRY, RADIO, REPLACES SLIP RINGS
Miniature Multichannel FM/FM Systems With High Signal-to-Noise Ratio Transmit Low-Level Test Signals From High Speed Shafts. AUGUST 1961 PAGE 20

TELEPRINTER, MITE
High-speed printing without high-speed mechanical motion.
APRIL 1958 PAGE 39

TEMPERATURE CONTROL
Controlled water supply heats or cools equipment to maintain constant temperature. MAY 1961 PAGE 32

TEMPERATURE CONTROL, PROPORTIONAL
Integral heater and sensor stabilizes temperature within 0.001 degree C.
DECEMBER 1961 PAGE 34

TERMINALS, WIRE WRAP
Flute design speeds assembly.
JULY 1959 PAGE 10

TEST LAB, MOBILE VIBRATION
Shakers similar to radio speakers transmit high amplitude vibrations for aircraft structure tests. JULY 1958 PAGE 32

TEST TECHNIQUES, RANDOM MOTION
Methods for compensating test system resonances. JULY 1959 PAGE 24

TESTER, DIODE
Portable unit checks polarity in specified circuit positions.
FEBRUARY 1961 PAGE 37

TESTER, PRECISION TORQUE
Air bearing design permits measurement of torques well below the one-tenth dyne centimeter level. MAY 1960 PAGE 32

TESTER, SHAFT ENCODER
One million logic operations in less than 3 minutes. OCTOBER 1961 PAGE 47

TESTER, TORQUE
Hysteresis brake reduces starting torque and speeds performance.
DECEMBER 1961 PAGE 19

TESTER, TRANSDUCER
Accurate thyratron circuit indicates test limits of voltage, resistance, shaft angle.
MAY 1961 PAGE 48

TESTING, AUTOMATIC SERVO
Unit plots Bode, Nichols and Nyquist responses within twelve minutes.
JANUARY 1961 PAGE 38

TESTING, DIODE
Magnetic four point clip eliminates errors.
SEPTEMBER 1961 PAGE 24

TESTING, DRY CIRCUIT
Use of a unique pulsing and gating technique avoids contact transfer and bounce errors and results in a testing system that is approximately 10 times more sensitive than most dry circuit test requirements. AUGUST 1962 PAGE 18

TESTING, DYNAMIC, OF INDUSTRIAL INSTRUMENTS
Analysis of the major problems in industrial instrument design.
JULY 1961 PAGE 20

TESTING, ENVIRONMENTAL
Part I: Qualification testing, reliability, environmental test laboratories, military specifications, random vibration testing, chart of environmental test specifications, description of environmental tests, acoustic noise testing, radiation effects.
MARCH 1959 PAGE 43
Part II: Radio interference; test chambers; vibration and acoustic noise; buyer's guide to environmental test equipment and laboratories. JUNE 1959 PAGE 49

TESTING, ENVIRONMENTAL, OF BALLISTIC MISSILE RE-ENTRY VEHICLES
Acoustic noise testing, simulation of aerodynamic heating by electric arc-heated wind tunnel. Combined temperature-acceleration-vibration testing.
MARCH 1959 PAGE 28

TESTING, HEAT TRANSFER
Accurate measurements with simple device. SEPTEMBER 1960 PAGE 45

TESTING, IMPEDANCE, MECHANICAL
Impedance head measures forces and accelerations at the same point.
MAY 1961 PAGE 44

TESTING, MISSILE COMPONENTS
From test stand to dial-a-circuit "go-no-go" simulator. MAY 1959 PAGE 7

TESTING, POTENTIOMETER
Fast automatic checkout of performance characteristics.
SEPTEMBER 1961 PAGE 27

TESTING, RANDOM WAVE VIBRATION SYSTEMS
New instrumentation and techniques for stimulating severe vibration environments.
MARCH 1959 PAGE 22

TESTING, VIBRATION
Electrohydraulic systems combine high force and long strokes.
APRIL 1960 PAGE 31

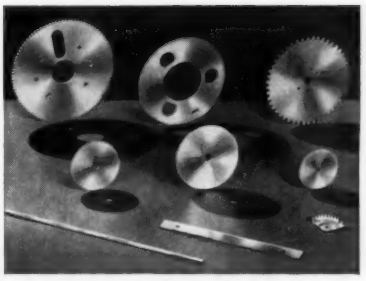
TESTING TIMESAVER, DYNAMIC
Filming a failure with X-ray.
MARCH 1958 PAGE 38

THERMAL PROTECTION FOR AIRBORNE ELECTRONIC SYSTEMS
Four approaches, used either separately or in combination, provide efficient heat removal. JANUARY 1961 PAGE 50

THERMISTOR COORDINATES
Plotted on this special set of coordinates, thermistor resistance vs. temperature characteristics appear as a straight line.
FEBRUARY 1959 PAGE 40

THERMISTOR COORDINATES
OCTOBER 1960 PAGE 90

THERMISTORS, POSITIVE TEMPERATURE COEFFICIENT
New thermal switches prevent overtemperature of hermetic motors.
JANUARY 1959 PAGE 8



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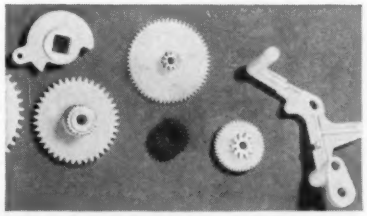

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CIRCLE NO. 28 ON INQUIRY CARD

SERVO NEWS

NEW! COMPLETE DATA FILE ON VERNITRON PRECISION SERVO COMPONENTS

Here's all the data you need, in one handy package, for specifying: **CONTROL & TORQUE SYNCHROS:** Transformers, transmitters, receivers, differential transmitters and receivers, receiver transmitter. Engineered and manufactured to MIL-S-20708A, MIL-S-16892, MIL-S-12472, MIL-S-2335, FXS-1066, Sizes: 8, 11, 15, 22, 23. Frequency: 60 and 400 cycles, Accuracy to ± 3 minutes. **RESOLVERS:** Data transmission, computing, phase shifting, sweep, including feedback units with high voltage capabilities between windings. Engineered and manufactured to MIL-R-14346. Sizes: 8 through 23. Frequency: 60 through 10,000 cycles. Deviation from Sine Wave: to ± .05%.

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CIRCLE NO. 29 ON INQUIRY CARD

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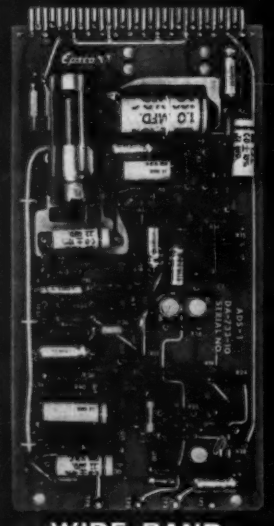
SOLID STATE, CHOPPER STABILIZED
DC AMPLIFIERS
MODELS ADS-1, 2, 3, 4
FEATURE LOW NOISE AND DRIFT WITH HIGH AND LOW SOURCE IMPEDANCE



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FEATURES

- Solid state circuitry
- Stabilized for operation with wide variety of inputs and feedback networks
- Short circuit proof
- Gain of 2 x 10⁷ Min.
- Silicon transistors insure excellent high temperature operation
- Models 2, 3 and 4 feature high gain and/or differential inputs

APPLICATIONS

- OPERATIONAL AMPLIFIER
- BUFFER AMPLIFIER
- SUMMING AMPLIFIER
- INTEGRATING AMPLIFIER
- INVERTER AMPLIFIER
- POTENTIOMETRIC AMPLIFIER

SELECTED SPECS-ADS-1

DC GAIN	2 x 10⁷ min.
INPUT IMPEDANCE	(at DC) 250 K ohms
GAIN X BANDWIDTH PRODUCT	1 Mc
NOISE VOLTAGE	(DC to 10 kc) 15 μv RMS (typ)
NOISE CURRENT	(1 kc to 11 kc) 0.25 x 10⁻⁹ Amps RMS (typ)
DRIFT	3μv/°C (Max) 2 x 10⁻¹¹ Amps/°C (Max)
SETTLING TIME	20 μsec to .1%

PRICES AS LOW AS $189.50

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THERMISTORS, PTC
Low cost temperature control device. JULY 1961 PAGE 16

THERMO-ELECTRON ENGINE
Atomic heat converted to electricity; no moving parts. APRIL 1958 PAGE 27

THERMOELECTRIC GENERATOR
Isothermal Hot Rod, Key to Optimum Performance AUGUST 1961 PAGE 14

THERMOELECTRIC MODULES
Cooling below ambient temperatures significantly reduces component failure. APRIL 1960 PAGE 24

THERMOMETERS, PLATINUM RESISTANCE
All the information you need to use platinum resistance thermometers in a variety of bridge circuits and control systems. JULY 1958 PAGE 40

TIMERS
Part I: Application, fundamental characteristics, sources of time delay, practical considerations, output circuitry, timer combinations. MARCH 1961 PAGE 51
Part II: Electric Timing Motors — basic types, performance characteristics, governed dc motors, selection factors, application factors, commercial units. MAY 1961 PAGE 59
Part III: Motor-driven timing devices — output mechanisms, timing cycles, complex devices, commercially available units. AUGUST 1961 PAGE 43

TIMERS, MODULAR REPEAT-CYCLE
Special replaceable switches and easily adjustable cams provide advantages for many applications. APRIL 1962 PAGE 30

TORQUE TESTER
Hysteresis brake reduces starting torque and speeds performance. NOVEMBER 1961 PAGE 19

TORQUE TESTER, PRECISION
Air bearing design permits measurement of torques well below the one-tenth dyne centimeter level. MAY 1960 PAGE 32

TRACER SYSTEM, 2-D
Electromechanically controlled system will follow any contour around a 360° path at constant speed. JANUARY 1960 PAGE 26

TRACKER, SMALL OPTICAL
Three circuit techniques for radiation tracking. MARCH 1958 PAGE 24

TRACKING, MISSILE
Film transport and shutter phasing designs take the bounce out of the camera. SEPT.-OCT. 1957 PAGE 60

TRACKING, SATELLITE
Digital equipment provides accurate tracking data. JANUARY 1961 PAGE 28

TRANSDUCER, NEW PRINCIPLE
High-level electrical response from minute physical motion. OCTOBER 1959 PAGE 24

TRANSDUCER ELEMENT
High resolution pickup operates in control systems without the use of amplification. JULY 1960 PAGE 14

TRANSDUCER TESTER
Accurate thyratron circuit indicates test limits of voltage, resistance, shaft angle. MAY 1961 PAGE 48

TRANSDUCER, ANGLE
Direction of gravity detected photoelectrically. SEPTEMBER 1959 PAGE 34

TRANSDUCERS, ANGLE OF ATTACK
Split wedge approach to angle of attack measurement. NOV.-DEC. 1957 PAGE 34

TRANSDUCERS, DISPLACEMENT
High power sensitivity simplifies system design. JUNE 1960 PAGE 30

TRANSDUCERS, ELECTRO-ACOUSTICAL, ELECTRICAL ANALOGS FOR ANALYSIS OF
Electrostatic and electromagnetic couplings for the analysis of electrical and mechanical energy conversions. NOVEMBER 1962 PAGE 30

TRANSDUCERS, ELECTROMAGNETIC AND POTENTIOMETER

Part I: 1. Resistive & magnetic pickoffs. 2. Magnetic transducers, basic theory. 3. Transducer equivalent circuits. 4. Effect of small circuit changes on performance. 5. Temperature compensation of output magnitude. 6. Inductive pickoffs. 7. Synchros. 8. Electrical resolvers. 9. Induction potentiometers. 10. Differential transformers.
FEBRUARY 1959 PAGE 41

Part II: Synchrotels, Inductosyns, Magnesyns, Microsyns.
MARCH 1959 PAGE 33

Part III: Very low torque pots, accelerometers and pressure pickups, summary of manufacturers' data, buyer's guide for transducers. MAY 1959 PAGE 35

TRANSDUCERS, INDUCTION

Generalized approach to design of nonlinear induction pots.
OCTOBER 1959 PAGE 16

TRANSDUCERS, PRECISION, STANDARDIZING AND MEASURING

How to design trimming circuits to standardize transducers and test sets to measure their performance.
FEBRUARY 1959 PAGE 36

TRANSDUCERS, SERVO OUTPUT, WITH INDEPENDENT ANGLE REFERENCE

Transducer module engages servo gear train at specified servo position and returns to specified position in response to external command signals.
DECEMBER 1958 PAGE 12

TRANSDUCERS, ULTRASONIC

Semiconductor depletion layer key to efficient generation of ultrasonic waves at high frequencies.
SEPTEMBER 1961 PAGE 32

TRANSFORMERS, ELECTRICAL

Nested laminations as cores offer greater design flexibility.
SEPTEMBER 1960 PAGE 28

TRANSFORMERS, POWER

New constant oil-pressure design for cooling. NOV.-DEC. 1957 PAGE 64

TRANSFORMERS, POWER, PROTECTION

Fault-pressure relay responds to primary shock-wave produced in oil by a fault.
JULY 1959 PAGE 6

TRANSFORMERS, ROTATING

Frictionless current-transfer for rotating assemblies. JUNE 1961 PAGE 19

TRANSFORMERS, VARIABLE

Parallel-winding designs with fine voltage resolution prevent high brush current and excessive heating in high power applications. AUGUST 1962 PAGE 24

TRANSISTOR, "PANCAKE"

Wafer-thin units triple printed board capacity. AUGUST 1960 PAGE 17

TRANSISTOR, PARAMETRIC MODE

New development may simplify communication equipment and computers.
NOVEMBER 1960 PAGE 47

TRANSISTOR, SILICON EPITAXIAL

Processing technique reduces collector resistance and switching time.
DECEMBER 1960 PAGE 23

TRANSISTOR CIRCUITS, ANALOG APPROACH

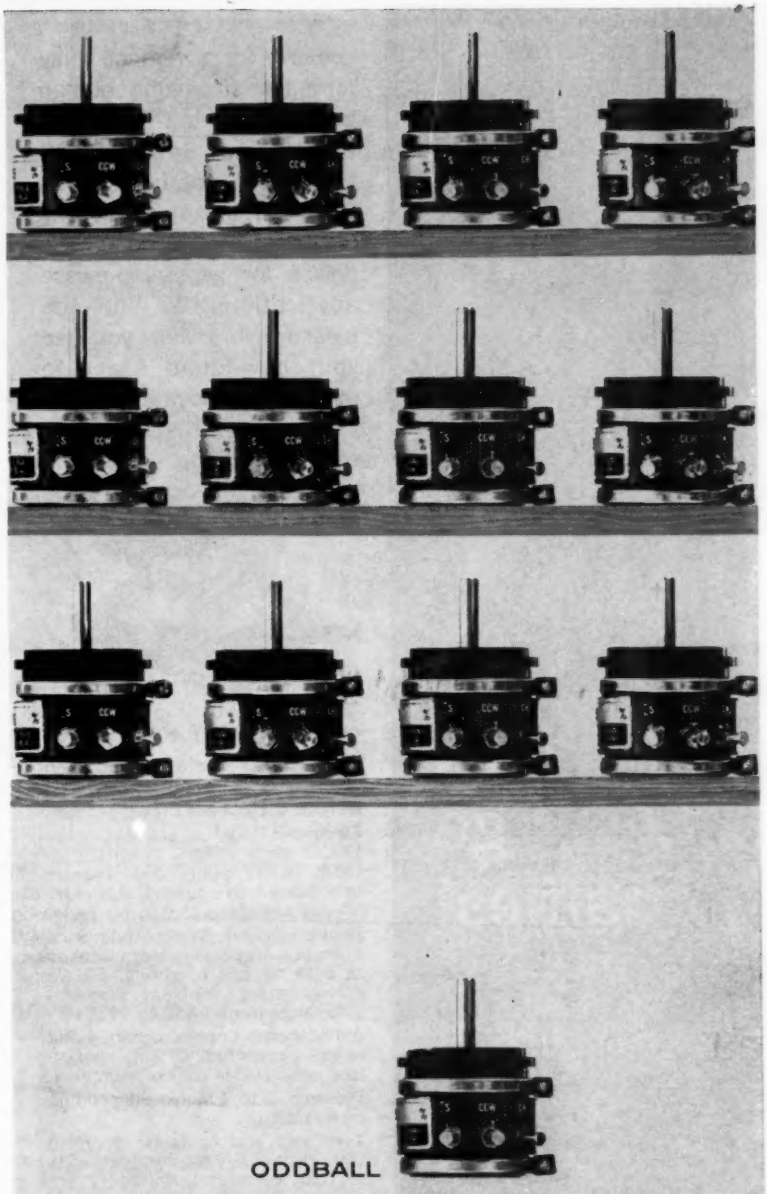
An economical solution for determining design requirements for overvoltage and overload protection in transistor circuits.
OCTOBER 1961 PAGE 40

TRANSISTOR CIRCUITS, CAPACITOR COUPLING

Solution of two problems exploit advantages of capacitor coupling in transistor circuits. SEPTEMBER 1961 PAGE 16

TRANSISTOR RELIABILITY

"Helium Bomb Test" improves the detection of leakage; greater product uniformity results from new process.
APRIL 1961 PAGE 38



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This seemingly ordinary single-turn potentiometer features some extraordinary specifications. Only ⅞" in diameter, it has a linearity of ±0.2% absolute, in 165° of electrical rotation, with 1.5 megohm load on the slider. This is the equivalent of 0.1% absolute linearity in full rotation of 352°.

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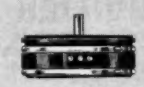

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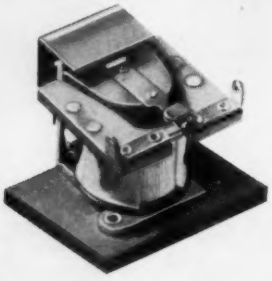

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Dimensions: Approx. 1 cu. inch volume!

Weight: 1¼ ounces max.!

Electrical: Rated at 115 VAC resistive, 3 amps max. 1 Form C contacts (SPDT operation), require only 2.5 VA to operate. Maximum AC coil voltage is 220 V, 60 cycle.

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Delivery: 1 to 4 weeks, depending on quantity.

Terminals and contacts: Supplied with a cover and lugs and/or leads for coil terminals. Contacts are silver, palladium, coin silver or any other required material.

Cornell-Dubilier produces the following complete lines of relays for commercial, industrial and military applications: high-reliability telephone-type relays, miniature semi-sensitive general-purpose relays, intermediate multi-pole general-purpose relays, miniature heavy-duty power contactors, deliberately desensitized differential relays for electro-mechanical discrimination, solenoids, hundreds of special types to suit your individual needs.

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CIRCLE NO. 32 ON INQUIRY CARD

TRANSISTORS, DIFFUSED-BASE
Epitaxial films reduce switching time. AUGUST 1960 PAGE 68

TRANSISTORS, HIGH TEMPERATURE
Operation at 925F predicted for silicon carbide unit. APRIL 1961 PAGE 41

TRANSISTORS AND DIODES, HERMETICALLY SEALED SILICON CHIP
Micro-thin glass film seals reliability into hundreds of devices in one operation. DECEMBER 1961 PAGE 20

TRANSMISSION, ROTATING
Mutiple pinions and injected-nylon splining provide control flexibility and high torque capacity. MARCH 1961 PAGE 26

TRANSMITTERS, PRESSURE
Water pressure "converted" to electrical output for indication and control. DECEMBER 1959 PAGE 24

TUBE, DIRECT PRINTING
Development of a high definition electron gun and a unique conductive printing head in tube design makes possible high speed communication from machine to man. MARCH 1960 PAGE 18

TUBE, ELECTRON, RELIABILITY
New heat conducting shield prolongs tube life. JAN.-FEB. 1958 PAGE 16

TUBE PICTURE, SIMPLIFIED DESIGN OF
Single-gun construction of color tubes eliminates beam convergence problems. Post deflection focusing and phosphor strip positioning further enhance color resolution. JUNE 1958 PAGE 8

TUBE, RECEIVING
Match-box design with mount structure locked within the envelope improves microphonism and resistance to severe vibration. JUNE 1958 PAGE 8

TW-SCOPE—TV INSPECTION SYSTEM
Traveling wave scope in closed circuit TV solves problem of inspecting waveforms of high speed switching transistors with rise-time of millimicroseconds and switching of about 10 volts. NOVEMBER 1958 PAGE 36

ULTRASONIC, DELAY LINES
Multicomponent glass materials reduce temperature dependence. MARCH 1960 PAGE 14

ULTRASONIC DRILLING
Now applied to intricate ceramic parts. SEPT.-OCT. 1957 PAGE 80

VALVES, HIGH PRESSURE
Anti-dribble, Bubble Tight Closure for High Pressure, High Flow Valves. AUGUST 1961 PAGE 12

VALVES, HYDRAULIC
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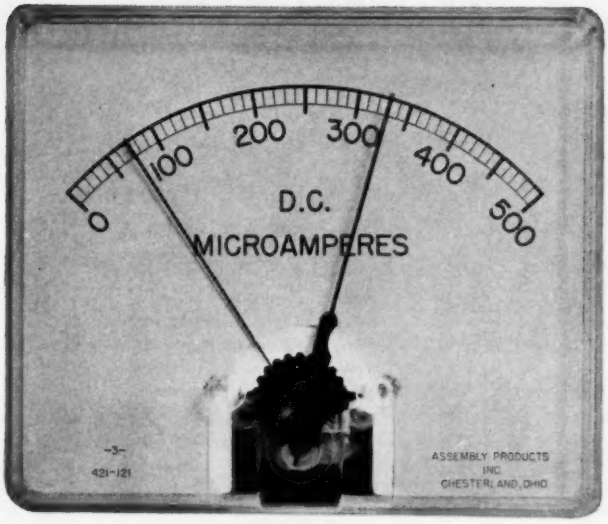

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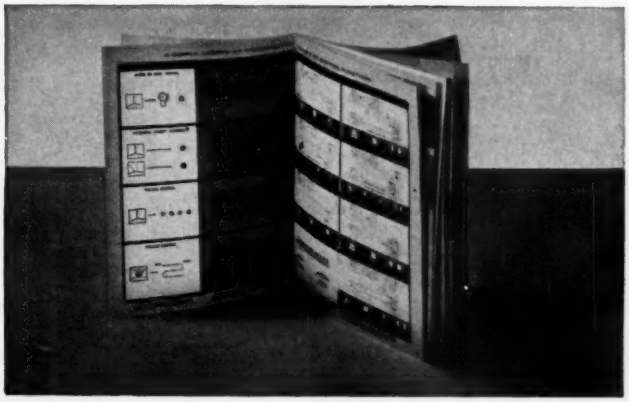

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